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Serial: NPD-NRC-2015-055
December 23, 2015

10 CFR 52.79
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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

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**LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 135 RELATED
TO IEEE 603 AND SOURCE RANGE NUCLEAR INSTRUMENTATION FLUX DOUBLING**

- References:
1. Letter from Donald Habib (NRC) to Christopher M. Fallon (DEF), dated November 25, 2015, "REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 135 RELATED TO STANDARD REVIEW PLAN SECTION 7.2, REACTOR TRIP SYSTEM, AND SECTION 16, TECHNICAL SPECIFICATIONS, FOR THE LEVY NUCLEAR PLANT UNITS 1 AND 2 COMBINED LICENSE APPLICATION"
 2. Letter from Christopher M. Fallon (DEF) to USNRC, dated September 1, 2015, "SUBMITTAL OF EXEMPTION REQUEST AND DESIGN CHANGE DESCRIPTION FOR DEPARTURE FROM AP1000 DCD REVISION 19 TO ADDRESS COMPLIANCE WITH IEEE-603-1991"
 3. Letter APC_APG_000344 from Paul A. Russ to Richard Grumbir, dated 12/23/2015, "Westinghouse Response to NRC RAI 135"

Ladies and Gentlemen:

Duke Energy Florida (DEF) hereby submits a response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) provided in Reference 1.

Enclosure 1 includes the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-15-4327, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

Enclosure 2 includes proprietary copy of APP-GW-GF-103, Revision 0, "Westinghouse Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)".

Enclosure 3 includes copy of the Non-proprietary response to NRC RAI 135, "Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)".

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NRO

As Enclosure 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an Affidavit signed by Westinghouse, the owner of the information. The Affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations. Accordingly, it is respectfully requested the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-15-4327 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

The response to NRC information request #8399 in Enclosure 2 identifies changes to Technical Specification Bases that will be incorporated in a future revision of the LNP COLA.

If you have any further questions, or need additional information, please contact Bob Kitchen at (704) 382-4046, or me at (704) 382-9248.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 23, 2015

Sincerely,



Christopher M. Fallon
Vice President
Nuclear Development

Enclosures:

1. Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-15-4327, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice
2. Copy of Proprietary APP-GW-GF-103, Revision 0, "Westinghouse Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)"
3. Copy of the Non-proprietary response to NRC RAI 135, "Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)"

cc: U.S. NRC Region II, Regional Administrator (w/o enclosures)
Mr. Donald Habib, U.S. NRC Project Manager (w/ enclosures)

Enclosure 1 to Serial NPD-NRC-2015-055

**Westinghouse Application for Withholding Proprietary
Information from Public Disclosure CAW-15-4327,
accompanying Affidavit, Proprietary Information
Notice, and Copyright Notice**

(9 pages including cover page)



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CAW-15-4327

23 December 2015

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: **APP-GW-GF-103, "Westinghouse Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)"**

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-15-4327 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by APOG.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-15-4327, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

Very truly yours,

A handwritten signature in cursive script that reads "Paul A. Russ".

Paul A Russ, Director

US Licensing and Regulatory Affairs

CAW-15-4327
23 December 2015

Enclosures:

1. Affidavit, Proprietary Information Notice, Copyright Notice, dated December 23, 2015
2. APP-GW-GF-103 Revision 0, "Westinghouse Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)"
3. Non-proprietary response to NRC RAI 135, "Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)"

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, Paul A Russ, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.



Paul A Russ, Director

US Licensing and Regulatory Affairs

- (1) I am Director, US Licensing and Regulatory Affairs, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

 - (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
 - (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
 - (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
 - (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
 - (f) It contains patentable ideas, for which patent protection may be desirable.
- (iii) There are sound policy reasons behind the Westinghouse system which include the following:
- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
 - (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
 - (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.
- (v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
- (vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in APP-GW-GF-103 Revision 0, "Westinghouse Response to NRC RAI 135, #8399 (Question 16-5) and #8404 (Question 07.02-1)" for submittal to the Commission, being transmitted by APOG letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with the topic of PMS Flux Doubling and may be used only for that purpose.
- (a) This information is part of that which will enable Westinghouse to:
 - (i) Provide the NRC and customers with technical information on the on the PMS Flux Doubling.

- (b) Further this information has substantial commercial value as follows:
- (i) Westinghouse plans to sell the use of similar information to its customers for the purpose of providing more products and services.
 - (ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.
 - (iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar systems in commercial power reactors and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

Enclosure 3 to Serial NPD-NRC-2015-055

**Copy of the Non-proprietary Response to
NRC RAI 135, “Response to NRC RAI 135, #8399
(Question 16-5) and #8404 (Question 07.02-1)”**

(10 pages including cover page)

REQUEST FOR ADDITIONAL INFORMATION (RAI)

RAI #8399

16-5

10 CFR 50.36, "Technical Specifications;" 10 CFR 52.97, "Issuance of Combined Licenses;" and Section VIII.B.5.a of Appendix D, "Design Certification of AP1000 Design," to 10 CFR Part 52 provide the regulatory basis for the following questions. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility. Subsection 52.97(a)(1) applies because the Commission must have sufficient information to find that applicable NRC regulations have been met. Section VIII.B.5.a of Appendix D to 10 CFR Part 52 applies as it relates to control of departures from generic technical specifications in a combined license application referencing the AP1000 design.

NUREG-1431, "Standard Technical Specifications Westinghouse Plants," provides NRC guidance on format and content of technical specifications that may be used to develop plant-specific technical specifications (TS) which meet 10 CFR 50.36 requirements.

In its letter dated September 1, 2015, Duke Energy proposed a change to the design of the instrumentation for the Boron Dilution Block Function of the Protection and Monitoring System (PMS) to address a non-conformance to IEEE 603 – 1991, which is an industry standard incorporated by reference in 10 CFR 50.55a(h). The proposed PMS design change includes revising TS Subsection 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," by adding a new ESFAS Interlock permissive, P-8, as Function 18.d, to permit manual blocking of the actuation logic of the Source Range Neutron Flux Doubling Function (LCO 3.3.2 Function 15.a, "Boron Dilution Block on Source Range Neutron Flux Doubling," and Function 16.f, "Chemical Volume and Control System Makeup Isolation on Source Range Neutron Flux Doubling") during reactor startup, and to automatically close the CVS demineralized water system isolation valves if Functions 15.a and 16.f are manually blocked below P-8. The P-8 permissive setpoint is Reactor Coolant System (RCS) average temperature (T_{avg}) $\geq 551^{\circ}\text{F}$, which is the minimum temperature for making the reactor critical (LCO 3.4.2, "RCS Minimum Temperature for Criticality"). Since LCO 3.4.2 does not allow making the reactor critical below 551°F , the new design automatically enables Functions 15.a and 16.f (which references 15.a) below the P-8 setpoint.

As part of this design change, the applicant proposed to revise TS Subsection 3.3.2, and the associated Bases. The staff requests clarification of the following proposed changes:

1. In TS Subsection 3.3.2, Table 3.3.2-1 (page 9 of 13), the applicant proposed to revise the Mode 3 Applicability of Function 15.a, to indicate that this Function is "not applicable for valve isolation Functions whose associated flow path is isolated" (i.e., by applying Footnote (e) to the listed Mode 3).

In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2 (page B 3.3.2-37), the applicant proposed to revise the description of Function 15 as follows (Added text shown in bold face, removed text is lined out.)

The block of boron dilution is accomplished by closing the CVS **makeup line isolation** ~~suction valves~~ **or closing the CVS** to demineralized water **system isolation** ~~storage tanks valves~~, and ~~aligning the boric acid tank to the CVS~~ **makeup pumps**. This Function is actuated by Source Range Neutron Flux Doubling and Reactor Trip.

The discussion of LCO 3.3.2 Function 15.b, which references Function 18.b, "ESFAS Interlocks, Reactor Trip, P-4," is also revised, in part, as follows. The applicant is requested to respond as to whether the clarifications as indicated by the **blue** colored added text and the lined out text are correct or to provide alternative clarification as to the paragraph below.

A P-4 signal initiates isolation of RCS makeup from the CVS ~~Demineralized Water Makeup is also isolated (CVS demineralized water system,~~ **by closing the demineralized water system isolation valves, and aligning the CVS makeup pump suction to the boric acid tank.** ~~aligned to the CVS makeup pumps)~~ **Unborated water source makeup isolation is initiated** by all the Functions that initiate a Reactor Trip.

The staff noted that the applicants changes to the TS Bases do not appear to reflect the proposed change to Table 3.3.2-1 (page 9 of 13), and the PMS design as described in FSAR (DCD Tier 2) Chapter 7. The applicant is requested to update the Bases to accurately reflect the proposed design change or explain why an update is not needed.

2. In TS Subsection 3.3.2, Table 3.3.2-1 (page 10 of 13), the applicant proposed adding a new ESFAS Interlock permissive, P-8, as Function 18.d, to permit manual blocking of the actuation logic of the Source Range Neutron Flux Doubling Function (LCO 3.3.2 Functions 15.a and 16.f) during reactor startup. Function 18.d, "ESFAS Interlocks, Reactor Coolant Average Temperature, P-8," is applicable in Modes 2, 3, 4 and 5, and requires 4 operable channels. Actions table Condition J ("One or two interlock channels inoperable") specifies action requirements for P-8.

The staff noted that the required actions and associated completion times for Condition J are appropriate for a typical instrumentation Function that has 4 channels of sensor input and a 2-out-of-4 coincidence logic scheme. The staff could not identify which logic scheme is used (e.g., 1-out-of-4 or 2-out-of-4) to initiate closure of the demineralized water system isolation valves as shown in the revised DCD Figure 7.2-1 Sheet 3 of 21, and therefore could not determine if Condition J is the correct assignment for the new P-8 ESFAS interlock Function.

The applicant is requested to provide the missing details concerning the logic for actuation of the boron dilution block, in FSAR Chapter 7, and, if needed, to revise TS Subsection 3.3.2 and associated Bases accordingly.

3. In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2 (page B 3.3.2-42), the applicant proposed to add a discussion of the new P-8 ESFAS interlock Function as follows; the applicant is requested to respond as to whether the **blue** additions and lined out deletions in the paragraph below are correct or to provide alternative clarifications:

The P-8 interlock is provided to permit a manual block of or to reset a manual block of the automatic Source Range Neutron Flux Doubling actuation of the Boron Dilution Block (Function 15.a).

The **automatic Source Range Neutron Flux Doubling actuation of the** Boron Dilution Block **Function** may be manually blocked (**disabled**) to permit plant startup and normal power operation when above the P-8 reactor coolant average temperature **setpoint**.

The **manual block to disable the automatic Source Range Neutron Flux Doubling actuation of the** Boron Dilution Block **Function** is automatically reset upon decreasing ~~e-of-the~~ reactor coolant average temperature to below **the P-8 setpoint**.

Once ~~the~~ reactor coolant average temperature is below P-8, the Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function may **also** be manually blocked to prevent inadvertent actuation during refueling operations and post-refueling control rod testing.

When **the Source Range Neutron Flux Doubling actuation of** the Boron Dilution Block is manually blocked below P-8 during shutdown conditions, the CVS demineralized water system isolation valves are **will** automatically **close closed** to prevent inadvertent boron dilution.

The P-8 interlock is required to be OPERABLE in MODES 2, 3, 4 and 5. This Function is not applicable in MODES 3, 4 and 5, if the demineralized water makeup flow path is isolated. In MODE 6 a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

For improved clarity of the second, third, and fifth paragraphs of the above discussion, the applicant is requested to include the phrase "Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function" in place of just "Boron Dilution Block" or to provide an alternative clarification. The applicant is requested to use Function titles that are consistent with the PMS design description in FSAR Chapter 7 (Figure 7.2-1 Sheet 3 of 21).

4. In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.1 (page B 3.3.1-23), the staff noted the following discussion for Function 16.a, "Reactor Trip System Interlocks, Intermediate Range Neutron Flux, P-6," as follows:
 - a. Intermediate Range Neutron Flux, P-6

The Intermediate Range Neutron Flux, P-6 interlock is actuated when the respective PMS Intermediate Range Neutron Flux channel increases to approximately one decade above the channel lower range limit. The LCO requirement for the P-6 interlock ensures that the following Functions are performed:

- (1) on increasing power, the P-6 interlock allows the manual block of the respective PMS Source Range, Neutron Flux reactor trip. This prevents a premature block of the source range trip and allows the operator to ensure that the intermediate range is OPERABLE prior to leaving the source range. When the source range trip is blocked, the high voltage to the detectors is also removed.
- (2) on decreasing power, the P-6 interlock automatically energizes the PMS source range detectors and enables the PMS Source Range Neutron Flux reactor trip.
- (3) on increasing power, the P-6 interlock provides a backup block signal to the source range neutron flux doubling circuit. Normally, this Function is manually blocked by the main control room operator during the reactor startup.

The LCO requires four channels of Intermediate Range Neutron Flux, P-6 interlock to be OPERABLE in MODE 2 when below the P-6 interlock setpoint.

In MODE 2, when below the P-6 interlock setpoint, the P-6 interlock must be OPERABLE. Above the P-6 interlock setpoint, the PMS Source Range Neutron Flux reactor trip will be blocked; and this Function will no longer be necessary. In MODES 3, 4, 5, and 6, the P-6 interlock does not have to be OPERABLE because the PMS Source Range is providing core protection.

In the above discussion, Item a.(3) appears to be relevant to Function 18.c for ESFAS Interlocks in TS Subsection 3.3.2, "ESFAS Instrumentation," and this information should be included in the TS Bases B 3.3.2. Further, the staff noted that the proposed design change affects the ESFAS Interlock P-6 signal to the logic of the source range neutron flux doubling circuit. However, a change to the Bases discussion for P-6 (Function 18.c) was not proposed as part of this submittal. The applicant is requested to clarify this discussion in the TS Bases B 3.3.2 regarding this logic change to P-6 including relevant information contained in Item a.(3) above.

RAI #8404

07.02-1

Clarify how the single failure criterion is met in the revised logic. Also provide additional clarifications on how automatic functions are implemented in the revised logic.

10 CFR 50.55a(h)(3) states "Applications filed on or after May 13, 1999, for construction permits and operating licenses under this part, and for design approvals, design certifications, and combined licenses under part 52 of this chapter, must meet the requirements for safety systems

in IEEE Std. 603–1991 and the correction sheet dated January 30, 1995.” IEEE Std. 603-1991, Clause 5.1 requires that all safety systems shall meet the single failure criterion.

10 CFR 52.47(a)(2) requires, in part, that the description of the structures, systems, and components shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. The guidance of SRP Appendix 7.1-C, “Guidance for Evaluation of Conformance to IEEE Std. 603”, Section 4, “Safety System Designation”, states that the information provided for the design basis items, taken alone and in combination, should have one and only one interpretation. The applicant is requested to provide responses to the following questions raised on the Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Compliance with IEEE 603-1991:

1. The revised Figure 7.2-1 (Sheet 3 of 21) in the submitted change package shows that there are separate momentary controls for each applicable division for the “FLUX DOUBLING BLOCK CONTROL”. Clarify whether or how the single failure criterion is met for the newly added actuation signal sent to “CLOSE DWS ISOLATION VALVES”.
2. It is not clear whether the “reset” function mentioned in Bullet 3 on Page 2 of 13 in the submitted change package is automatic or not. If it is an automatic action, clarify where and how the pre-condition “if CVS valves 136A and 136B are opened” is implemented in the revised logic Figure 7.2-1 (Sheet 3 of 21).
3. There are two “CLOSE DWS ISOLATION VALVES” functional blocks (one is existing and the other is new) shown on the revised Figure 7.2-1 (Sheet 3 of 21). The newly added Note 5 states that the new “CLOSE DWS ISOLATION VALVES” functional block is not part of the ESF actuation function. Provide clarification on what differences exist between the above two functional blocks and why the new “CLOSE DWS ISOLATION VALVES” functional block is not an ESF actuation function.

Response Information:

RAI #8399 (Question 16-5) Item 1:

The staff noted that the applicant's changes to the TS Bases do not appear to reflect the proposed change to Table 3.3.2-1 (page 9 of 13). The proposed change to Table 3.3.2-1 Function 15.a is to apply Footnote (e) to the listed Mode 3. In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2, Function 15.a, the second sentence should be revised to include Mode 3 (Added text in **red bold** face and underlined)

This Function is not applicable in MODES **3**, 4 and 5 if the demineralized water makeup flow path is isolated.

In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2 (page B 3.3.2-37), the staff's rendition of the applicant's proposed revision to the description of Function 15 is accurate with one exception. The words "CVS to" which appears in the phrase "**or closing the CVS** to demineralized water **system isolation** storage tanks valves" should be removed and the words "to CVS" added to the end of the sentence. The resulting paragraph (without annotation of added or removed text) should read as follows:

The block of boron dilution is accomplished by closing the CVS makeup line isolation valves or closing the demineralized water system isolation valves to CVS. This Function is actuated by Source Range Neutron Flux Doubling and Reactor Trip.

Clarification of the discussion of LCO 3.3.2 Function 15.b, which references Function 18.b, "ESFAS Interlocks, Reactor Trip, P-4," provided in this RAI is correct and included below (without annotation of added or removed text):

A P-4 signal initiates isolation of RCS makeup from the CVS by closing the demineralized water system isolation valves, and aligning the CVS makeup pump suction to the boric acid tank. Unborated water source makeup isolation is initiated by all the Functions that initiate a Reactor Trip.

RAI #8399 Item 2:

[

(a,c)

There is no description of logic coincidence for permissive signals in FSAR Chapter 7. The proposed changes to FSAR Chapter 7 provided in the original submittal regarding the P-8 interlock are consistent with similar information provided in FSAR Chapter 7 for other permissive signals. Therefore no changes to FSAR Chapter 7, other than proposed in the original submittal, are considered necessary.

RAI #8399 Item 3:

In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2, Function 18.d "Reactor Coolant Average Temperature, P-8", the staff's rendition of the applicant's proposed revision is accurate however one minor editorial correction is recommended. (Added text shown in **red bold** face.)

The P-8 interlock is provided to permit a manual block of or to reset a manual block of the automatic Source Range Neutron Flux Doubling actuation of the Boron Dilution Block (Function 15.a).

The automatic Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function may be manually blocked (disabled) to permit plant startup and normal power operation when above the P-8 reactor coolant average temperature setpoint.

The manual block to disable the automatic Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function is automatically reset upon decreasing reactor coolant average temperature to below the P-8 setpoint.

Once reactor coolant average temperature is below **the P-8 setpoint**, the Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function may also be manually blocked to prevent inadvertent actuation during refueling operations and post-refueling control rod testing.

When the Source Range Neutron Flux Doubling actuation of the Boron Dilution Block is manually blocked below P-8 during shutdown conditions, the CVS demineralized water system isolation valves ~~are~~ will automatically close to prevent inadvertent boron dilution.

The P-8 interlock is required to be OPERABLE in MODES 2, 3, 4 and 5. This Function is not applicable in MODES 3, 4 and 5, if the demineralized water makeup flow path is isolated. In MODE 6 a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

RAI #8399 Item 4:

While reviewing the description of Intermediate Range Neutron Flux, P-6 in the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.1 (page B 3.3.1-23) it was discovered that in Item a(3) the words "on increasing power" are not correct. Referring to the proposed change to FSAR Figure 7.2-1 (Sheet 3 or 21), the P-6 signal (labeled P-6A) enters the Flux Doubling Block Control via a Not Box and then to a One Shot (See Figure 7.2-1, sheet 1 index). With this combination a "true" output from the One Shot will only occur for a limited period of time after the P-6 signal changes from true (1) to false (0). Per FSAR Table 7.2-3 (Sheet 1 of 2), P-6 is true when intermediate range power is above setpoint and false when below setpoint. Therefore P-6 will only change from true (1) to false (0) on decreasing intermediate range power. Also from the proposed change to FSAR Figure 7.2-1 (Sheet 3 or 21), the short duration true(1) output of the One Shot enters an OR gate along with manual reset of the flux doubling block control. Therefore when P-6 changes from true (1) to false (0) on decreasing intermediate range power, the flux doubling block is reset and the source range neutron flux doubling circuit is enabled.

The "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.1 (page B 3.3.1-23) Item a(3) should be changed as follows: (Added text shown in **red bold** face, removed text is lined out.)

(3) on **decreasing** ~~increasing~~ power, the P-6 interlock **automatically resets the flux doubling block control ensuring** ~~provides a backup block signal to the source range neutron flux doubling circuit~~ **is enabled**. Normally, **the source range neutron flux doubling circuit** ~~this Function~~ is manually blocked by the main control room operator during the reactor startup.

The "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2, Function 18.c "Intermediate Range Neutron Flux, P-6" should be revised as follows: (Added text shown in **red bold** face, removed text is lined out.)

The Intermediate Range Neutron Flux, P-6 interlock is actuated when the respective NIS intermediate range channel increases to approximately one decade above the channel lower range limit. **Above the setpoint, the P-6 interlock allows manual block of the source range neutron flux reactor trip.** Below the setpoint, the P-6 interlock automatically **energizes the source range detectors and unblocks the source range neutron flux reactor trip.** **As intermediate range flux decreases from above the setpoint to below the setpoint, the P-6 interlock automatically resets the flux doubling block function ensuring** ~~unblocks the source range neutron flux doubling function~~ **is enabled,** ~~permitting the block of boron dilution.~~ Normally; **the source range neutron flux doubling f** ~~this Function~~ is blocked by the main control room operator during reactor startup. This Function is required to be OPERABLE in MODE 2.

RAI #8404: Response to 07.02-1 Item 1:

The Demineralized Water System Isolation Valves are controlled by Division A (CVS-V136A) and Division C (CVS-136B). When the block control is actuated for each division the respective isolation valve is closed. Because the isolation valves are in series in the line connecting the DWS to the Chemical and Volume Control System, the isolation function complies with the single failure criterion.

RAI #8404: Response to 07.02-1 Item 2:

The information previously supplied is incorrect. If the flux doubling logic is blocked below the P-8 setpoint, the CVS valves 136A and 136B cannot be reopened. There are no valve status feedbacks to the boron dilution protection logic. The corrected item 3 is:

When RCS temperature is below P-8 with the flux doubling signal block control logic actuated to block, reset of the flux doubling block control logic is required to open CVS valves 136A and 136B.

RAI #8404: Response to 07.02-1 Item 3:

The existing function block to "CLOSE DWS ISOLATION VALVES" is required to mitigate a possible design basis event (boron dilution) should one be in progress at the time of a reactor trip which makes this an ESF actuation function. The new function block to "CLOSE DWS ISOLATION VALVES" is being added to prevent a boron dilution from being possible if the flux doubling logic is blocked below P-8. Since this new function is not required to mitigate any design basis event it is not an ESF actuation function. Both functional blocks actuate closure of CVS valves 136A (Division A) and 136B (Division C). The physical components and process to close the DWS isolation valves downstream of PMS are the same for each function block.